

California Environmental Contaminant Biomonitoring Program
Designated Chemicals
February 2009

Metals		Phytoestrogens	
Antimony	Tungsten	Daidzein	Equol
Barium	Uranium	Enterodiol	Genistein
Beryllium	Arsenic	Enterolactone	O-Desmethylangolensin
Cadmium	Arsenic (III) acid		
Cesium	Arsenic (V) acid		
Cobalt	Monomethylarsonic acid		
Lead	Dimethylarsinic acid		
Mercury	Arsenobetaine		
Molybdenum	Arsenocholine		
Platinum	Trimethylarsine oxide		
Thallium			
Herbicides: Substituted Ureas			
Bensulfuron-methyl	Methyl methoxytriazine	Benzene	1,2-Dichloropropane
Chloroimuron ethyl	Metsulfuron-methyl	Bromodichloromethane	2,5-Dimethylfuran
Chlorsulfuron	Nicosulfuron	Bromoform	Ethylbenzene
Dimethoxy pyrimidine	Primisulfuron-methyl	Carbon tetrachloride	Hexachloroethane
Dimethyl pyrimidine	Prosulfuron	Chlorobenzene	Methylene chloride
Diuron	Rimsulfuron	Chloroform	Methyl-tert-butyl ether (MTBE)
Ethametsulfuron-methyl	Sulfometuron-methyl	Dibromochloromethane	Nitrobenzene
Foramsulfuron	Sulfosulfuron	Dibromomethane	Styrene
Halosulfuron	Thifensulfuron-methyl	1,2-Dibromo-3-chloropropane (DBCP)	Tetrachloroethene
Iodosulfuron	Triasulfuron	1,2-Dichlorobenzene	Toluene
Linuron	Triflusulfuron-methyl	1,3-Dichlorobenzene	1,1,2,2-Tetrachloroethane
		1,4-Dichlorobenzene	1,1,1-Trichloroethane
		1,1-Dichloroethane	1,1,2-Trichloroethane
		1,2-Dichloroethane	Trichloroethene
		1,1-Dichloroethene	m-/p-Xylene
		cis-1,2-Dichloroethene	o-Xylene
		trans-1,2-Dichloroethene	
Polybrominated Diphenyl Ethers (PBDEs)			
2,2',4'-Tribromodiphenyl ether (BDE 17)		Other Chemicals	
2,4,4'-Tribromodiphenyl ether (BDE 28)		Acrylamide	Glycidamide
2,2',4,4'-Tetrabromodiphenyl ether (BDE 47)			Perchlorate
2,3',4,4'-Tetrabromodiphenyl ether (BDE 66)		Diesel Exhaust	
2,2',3,4,4'-Pentabromodiphenyl ether (BDE 85)		Tobacco Smoke	
2,2',4,4',5-Pentabromodiphenyl ether (BDE 99)		Acrylamide	Nicotine (cotinine measured)
2,2',4,4',6-Pentabromodiphenyl ether (BDE 100)			
2,2',4,4',5,5'-Hexabromodiphenyl ether (BDE 153)			
2,2',4,4',5,6'-Hexabromodiphenyl ether (BDE 154)			
2,2',3,4,4',5',6-Heptabromodiphenyl ether (BDE183)			
2,2'4,4',5,5'-Hexabromobiphenyl (BB 153)			

Brominated and Chlorinated Organic Compounds Used as Flame Retardants, including but not limited to:

Bis(2-ethylhexyl) tetrabromophthalate	Bis(2-hydroxyethyl ether) TBBPA
Bis(hexachlorocyclopentadieno)cyclooctane	Chlorendic acid
1,2-Bis(2,4,6-tribromophenoxy)ethane	2,3-Dibromopropyl-2,4,6-tribromophenyl ether
Decabromodiphenylethane	N-N-Ethylene-bis(tetrabromophthalimide)
1,2-Dibromo-4-(1,2-dibromoethyl)cyclohexane	2-Ethylhexyl 2,3,4,5-tetrabromobenzoate
2-Ethylhexyl-2,3,4,5-tetrabromobenzoate	Hexabromobenzene
Hexabromocyclododecane	Hexachlorocyclopentadienyl-dibromocyclooctane
Hexachlorocyclopentadienyl-dibromocyclooctane	Pentabromotoluene
Pentabromoethylbenzene	Tetrabromobisphenol A bis(2,3)dibromopropyl ether
Short-chain chlorinated paraffins	Tetrabromophthalic anhydride
Tetrabromobisphenol A	Tetrakis(2-chloroethyl)dichloroisopentyldiphosphate
Tris(1,3-dichloro-2-propyl)phosphate	2, 4, 6-Tribromophenol
Tris(2-chloroethyl)phosphate	Tris(1-chloro-2-propyl)phosphate
2,2-Bis(bromomethyl)-1,3-propanediol	Tris(2,3-dichloro-1-propyl)phosphate
2,2-Bis(chloromethyl)trimethylene bis[bis(2-chloroethyl)phosphate]	

Polychlorinated Dibenzo-p-dioxins, Dibenzofurans, Coplanar and Mono-Ortho-Substituted Biphenyls

1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	2,3,7,8-Tetrachlorodibenzofuran (TCDF)
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	2,4,4'-Trichlorobiphenyl (PCB 28)
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	2,3',4,4'-Tetrachlorobiphenyl (PCB 66)
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	2,4,4',5-Tetrachlorobiphenyl (PCB 74)
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	3,4,4',5-Tetrachlorobiphenyl (PCB 81)
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	2,3,3',4,4'-Pentachlorobiphenyl (PCB 105)
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	2,3,3',4',6-Pentachlorobiphenyl (PCB 110)
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	2,3',4,4',5-Pentachlorobiphenyl (PCB 118)
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	3,3',4,4',5-Pentachlorobiphenyl (PCB 126)
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	2,3,3',4,4',5-Hexachlorobiphenyl (PCB 156)
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	2,3,3',4,4',5'-Hexachlorobiphenyl (PCB 157)
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	2,3',4,4',5,5'-Hexachlorobiphenyl (PCB 167)
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	3,3',4,4',5,5'-Hexachlorobiphenyl (PCB 169)
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	2,3,3',4,4',5,5'-Heptachlorobiphenyl (PCB 189)

Perfluorinated compounds

Perfluorooctanoic acid	Perfluorobutane sulfonic acid	Perfluoroctane sulfonamide
Perfluorooctane sulfonic acid	Perfluoroheptanoic acid	Perfluoroundecanoic acid
Perfluorohexane sulfonic acid	Perfluorononanoic acid	Perfluorododecanoic acid
Perfluorodecanoic acid		
N-Ethyl-perfluorooctane sulfonamide (measured by metabolite 2-(N-Ethyl-perfluorooctane sulfonamido) acetic acid)		
N-Methyl-perfluorooctane sulfonamide (measured by metabolite 2-(N-Methyl-perfluorooctane sulfonamido) acetic acid)		

Non-dioxin-like Polychlorinated Biphenyls

2,2',5-Trichloro biphenyl (PCB 18)	2,2',3,3',4,4',5-Heptachlorobiphenyl (PCB 170)
2,2'3,5'-Tetrachloro biphenyl (PCB 44)	2,2',3,3',4,5,5'-Heptachlorobiphenyl (PCB 172)
2,2',4,5'-Tetrachloro biphenyl (PCB 49)	2,2',3,3',4,5',6'-Heptachlorobiphenyl (PCB 177)
2,2',5,5'-Tetrachlorobiphenyl (PCB 52)	2,2',3,3',5,5',6-Heptachlorobiphenyl (PCB 178)
2,2',3,4,5'-Pentachlorobiphenyl (PCB 87)	2,2',3,4,4',5,5'-Heptachlorobiphenyl (PCB 180)
2,2',4,4',5-Pentachlorobiphenyl (PCB 99)	2,2',3,4,4',5',6-Heptachlorobiphenyl (PCB 183)
2,2',4,5,5'-Pentachlorobiphenyl (PCB 101)	2,2',3,4',5,5',6-Heptachlorobiphenyl (PCB 187)
2,2',3,3',4,4'-Hexachlorobiphenyl (PCB 128)	2,2',3,3',4,4',5,5'-Octachlorobiphenyl (PCB 194)
2,2',3,4,4',5' and 2,3,3',4,4',6-Hexachlorobiphenyl (PCB 138 & 158)	2,2',3,3',4,4',5,6-Octachlorobiphenyl (PCB 195)
2,2',3,4',5,5'-Hexachlorobiphenyl (PCB 146)	2,2',3,3',4,4',5,6' and 2,2',3,4,4',5,5',6-Octachlorobiphenyl (PCB 196 & 203)
2,2',3,4',5',6'-Hexachlorobiphenyl (PCB 149)	2,2',3,3',4,5,5',6-Octachlorobiphenyl (PCB 199)
2,2',3,5,5',6-Hexachlorobiphenyl (PCB 151)	2,2',3,3',4,4',5,5',6'-Nonachlorobiphenyl (PCB 206)
2,2',4,4',5,5'-Hexachlorobiphenyl (PCB 153)	2,2',3,3',4,4',5,5',6,6'-Decachloro biphenyl (PCB 209)

Polycyclic Aromatic Hydrocarbons (PAHs)

PAH	Metabolites Measured	PAH	Metabolites Measured
Benz[a]anthracene	1-, 3-, and 9- Hydroxy benz[a]anthracene	Fluorene	2-, 3-, and 9- Hydroxyfluorene
Benzo[c]phenanthrene	1-, 2-, and 3- Hydroxy- benzo[c]phenanthrene	Naphthalene	1- and 2- Hydroxy- naphthalene
Benzo[a]pyrene	3-Hydroxybenzo[a]pyrene	Phenanthrene	1-, 2-, 3-, 4-, and 9- Hydroxyphenanthrene
Chrysene	1-, 2-, 3-, 4, and 6- Hydroxychrysene	Pyrene	1-Hydroxypyrene
Fluoranthene	3-Hydroxyfluoranthene		

Organochlorine Pesticides

Pesticide	Metabolites Measured	Pesticide	Metabolites Measured
Aldrin	Dieldrin (and parent)	Hexachlorobenzene	Pentachlorophenol, 2,4,5- and 2,4,6- Trichlorophenol, (and parent)
Chlordane	Oxychlordane	Hexachlorocyclohexanes (HCH)	β - and γ -HCH, 2,4,5-tri, 2,4,6-tri- and penta-chlorophenol
DDT	<i>p,p'</i> -DDE (and <i>p,p'</i> and <i>o,p'</i> DDT)	Methoxychlor	Dihydroxy- and mono-hydroxy- methoxychlor
Dieldrin	(parent)	Mirex	(parent)
Endrin	(parent)	Pentachlorophenol	(parent)
Endosulfan	Endosulfan-ether, -lactone and -sulfate	Trichlorophenols	2,4,5- and 2,4,6- Trichlorophenol
Heptachlor	Heptachlor epoxide		

Organophosphate Insecticides: Dialkyl Phosphate Metabolites and Specific Metabolites

Insecticide	Metabolite Measured ¹	Insecticide	Metabolite Measured
Acephate	-	Malathion	Malathion dicarboxylic acid DMP, DMTP, DMDTP
Azinphos Methyl	DMP, DMTP, DMDTP	Methamidaphos	-
Chlorethoxyphos	DEP, DETP	Methidathion	DMP, DMTP, DMDTP
Chlorpyrifos	3,5,6-TCPy, DEP, DETP	Methyl parathion	p-Nitrophenol, DMP, DMTP
Chlorpyrifos Methyl	3,5,6-TCPy, DMP, DMTP	Naled	DMP
Coumaphos	CHMCO, DEP, DETP	Oxydemeton-methyl	DMP, DMTP
Diazinon	IMHP, DEP, DETP	Parathion	p-Nitrophenol, DEP, DETP
Dichlorvos (DDVP)	DMP	Phorate	DEP, DETP, DEDTP
Dicrotophos	DMP	Phosmet (Imidan)	DMP, DMTP, DMDTP
Dimethoate	DMP, DMTP, DMDTP	Pirimiphos-methyl	2-(Diethylamino)-6-methyl-pyrimidin-4-ol/one, DMP, DMTP
Disulfoton	DEP, DETP, DEDTP	Sulfotep	DEP, DETP
Ethion	DEP, DETP, DEDTP	Temephos	DMP, DMTP
Fenitrothion	DMP, DMTP	Terbufos	DEP, DETP, DEDTP
Fenthion	DMP, DMTP	Tetrachlorvinphos	DMP
Isazaphos-methyl	5-Chloro-1,2-dihydro-1-isopropyl-[3H]-1,2,4-triazol-3-one, DMP, DMTP		

¹ Dimethylphosphate (DMP) Dimethylthiophosphate (DMTP) Dimethyldithiophosphate (DMDTP), Diethylphosphate (DEP), Diethylthiophosphate (DETP), 3,5,6-Trichloro-2-pyridinol (3,5,6-TCPy), Diethyldithiophosphate (DEDTP), 3-Chloro-7-hydroxy-4-methyl-2H-chromen-2-one/ol (CHMCO), 2-Isopropyl-4-methyl-6-hydroxypyrimidine (IMHP)

Carbamate Pesticides**Fungicides**

Pesticide	Metabolite Measured	Fungicide	Metabolite Measured
Benfuracarb	Carbofuranphenol	Captafol	Tetrahydrophthalimide
Carbofuran	Carbofuranphenol	Captan	Phthalimide
Carbosulfan	Carbofuranphenol	Chlorothalonil	Tetrahydrophthalimide
Furathiocarb	Carbofuranphenol	Dichloran	(parent)
Propoxur	2-Isopropoxyphenol	Folpet	Phthalimide

Other Pesticides

Pesticide	Metabolite Measured	Fungicide	Metabolite Measured
N,N-Diethyl-3-methylbenzamide (DEET)	(parent DEET)	Mancozeb	Ethylenethio urea
p-Dichlorobenzene	2,5 Dichlorophenol	Maneb	Ethylenethio urea

Pyrethroid Pesticides

Pesticide	Metabolites Measured
Allethrin	cis/trans-Dimethylvinylcyclopropane carboxylic diacid
Cyfluthrin	4-Fluoro-3-phenoxybenzoic acid cis-3-(2,2-Dichlorovinyl)-2,2-dimethylcyclopropane carboxylic acid trans-3-(2,2-Dichlorovinyl)-2,2-dimethylcyclopropane carboxylic acid
Cypermethrin	3-Phenoxybenzoic acid
<i>cis</i> -Cypermethrin	cis-3-(2,2-Dichlorovinyl)-2,2-dimethylcyclopropane carboxylic acid
<i>trans</i> -Cypermethrin	<i>trans</i> -3-(2,2-Dichlorovinyl)-2,2-dimethylcyclopropane carboxylic acid
Deltamethrin	3-Phenoxybenzoic acid cis-3-(2,2-Dibromovinyl)-2,2-dimethylcyclopropane carboxylic acid
Natural pyrethrin 1	cis/trans-Dimethylvinylcyclopropane carboxylic diacid
Permethrin	3-Phenoxybenzoic acid
<i>cis</i> -Permethrin	cis-3-(2,2-Dichlorovinyl)-2,2-dimethylcyclopropane carboxylic acid
<i>trans</i> -Permethrin	<i>trans</i> -3-(2,2-Dichlorovinyl)-2,2-dimethylcyclopropane carboxylic acid
Resmethrin	cis/trans-Dimethylvinylcyclopropane carboxylic diacid

Other Herbicides

Herbicide	Metabolites Measured
2,4,5-Trichlorophenoxyacetic acid (2,4,5-T) salts and esters	2,4,5-T
2,4-Dichlorophenoxy-acetic acid (2,4-D) salts and esters	2,4-D 2,4-Dichlorophenol (minor)
Acetochlor	Acetochlor mercapturate
Alachlor	Alachlor mercapturate
Atrazine	Atrazine mercapturate Diaminochlorotriazine Desethylatrazine Desisopropylatrazine Hydroxyatrazine
Dacthal	(parent)
Metolachlor	Metolachlor mercapturate
Trifluralin	(parent)